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diffused light which we observe arises from atmospheric dispersion or from the direct light of stars which are too faint to be separately discernible, it is not wholly traceable to these causes. The light which is visible before a bright star enters the field of the telescope, however, is probably due almost entirely to the terrestrial atmosphere.

PREDICTIONS FOR THE TRANSIT OF MERCURY, NOVEMBER 10, 1894.

By Roger Sprague.

TIMES OF INGRESS AND EGRESS (EXTERNAL CONTACT) FOR UNIVERSITY PARK, COLORADO SPRINGS, PUEBLO, AND TRINIDAD, COL.

UNIVERSITY PK.		COL. SPRINGS.		PUEBLO.		TRINIDAD.	
Lat. 39° 40′ 36″ Long. 104° 56′ 54″ Log. ρ 9.999402		Lat. 38° 50′ Long. 104° 49.′5 Log. ρ 9.999424		Lat. 38° 17′ Long. 104° 36′ Log. ρ 9.999438		Lat. 37° 11′ Long. 104° 30′ Log. ρ 9.999465	
INGRESS. A. M. M. S. T.	EGRESS. P. M. M. S. T.	INGRESS. A. M. M. S. T.	EGRESS. P. M. M. S. T.	INGRESS. A. M. M. S. T.	EGRKSS. P. M. M. S. T.	INGRESS. A. M. M. S. T.	EGRESS. P. M. M. S. T.
H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H M. S.
8 55 59.2	2 12 16.94	8 55 58.91	2 12 16.46	8 55 58.96	2 12 16.07	8 55 59.18	2 12 15.45

University Park, Arapahoe Co., Colorado, Sept. 17, 1894.

PLANETARY PHENOMENA FOR JANUARY, FEBRUARY AND MARCH, 1895.

By Professor Malcolm McNeill.

The following brief notes on the Sun, Moon and planets, have been prepared at the request of the Council, and are designed for the aid of those interested in astronomy and who do not have an almanac. In the descriptive paragraphs Pacific Standard time is given, unless the contrary is indicated.

January, 1895.

The Earth is in perihelion on January 2 at 4 p.m.

Mercury at the beginning of the month is a morning star too near the Sun to be seen, passes inferior conjunction on the evening of January 9 and becomes an evening star. It moves rapidly away from the Sun and at the end of the month sets more than an hour later, so that it may possibly then be seen without telescopic aid under favorable conditions of weather.

Venus is also an evening star, setting about half an hour later than the Sun on January 1, and more than an hour later on January 31. It can probably be seen by a sharp eye soon after sunset after the first few days of the month; being very much brighter than *Mercury*, it can be seen much nearer the Sun. At the end of the month the two planets will be very close together. The nearest approach will be on the morning of February 1, when *Mercury* is only 35′, a distance slightly greater than the Sun's apparent diameter, north of *Venus*.

Mars is getting farther away from opposition and by the end of the month sets at about 1 A.M. It is moving eastward among the stars in the constellation *Aries*, and during the month it moves about 13°. Its distance in millions of miles from the Earth increases from eighty-one to one hundred and eight. By the end of the month its light will be only about one-seventh as great as at opposition, but it will still be a conspicuous object in the sky.

Jupiter is in excellent position for observation, being above the horizon most of the night. It is in the constellation *Gemini* and during the month moves westward (retrogrades) about 3°.

Saturn is a morning star and by the end of the month rises just after midnight. It is in the eastern part of the constellation *Virgo* and moves eastward about 1° during the month. The ratio of apparent major to minor axis of the rings is about three to one.

Uranus is also a morning star rising somewhat after 1 A.M. on January 31. It is in the constellation *Libra* and moves eastward about 1°.

Neptune is in the eastern part of the constellation *Taurus* and retrogrades about 36′. It is above the horizon most of the night.

FEBRUARY.

Mercury is an evening star until February 25, when it comes to inferior conjunction and becomes a morning star. It reaches its greatest eastern elongation on February 9, when it sets about an hour and a half after the Sun. The first half of the month is about the most favorable time of the year for seeing the planet. The next eastern elongation will occur early in June, and will also afford a good opportunity for seeing the planet, but perhaps not as good as at the present.

Venus is also an evening star, and is increasing its apparent distance from the Sun. At the end of the month it sets nearly two hours later. The relative motions of *Mercury* and *Venus* for the first part of the month are very interesting. Both planets are moving eastward among the stars at the beginning of the month. *Mercury's* motion is at first a little more rapid and it passes north of *Venus* 35′ on the morning of February 1. It increases its lead until it is about 1° east of *Venus*, but its speed slackens, while *Venus* keeps up about the same rate and overtakes *Mercury* on the morning of February 10. On February 15 *Mercury* gives up the race, stops, and begins to move westward. At the time of the second conjunction, *Mercury* is 2° 38′ north of *Venus*.

Mars sets earlier than it did during January. It moves about 17° eastward and northward from the constellation *Aries* into *Taurus*. Toward the close of the month it passes a few degrees south of the *Pleiades* group. Its distance from the Earth increases to 133,000,000 miles by the end of the month and it loses about one-third of its light during the month.

Jupiter sets before 3 A.M. at the close of the month. It is in the constellation *Gemini* and moves slowly westward until February 19 when it begins to move eastward, but the whole westward motion is only a little more than half a degree and the eastward motion not as much.

Saturn is gradually getting nearer a convenient time for observation. It rises by the close of the month at about 10 P.M. It is in the constellation *Virgo* and moves about 10′ eastward until February 15, and during the rest of the month moves about 14′ westward.

Uranus is in the constellation *Libra*, a little to the east of its January position. After February 22 it moves slightly westward.

Neptune remains in *Taurus* and retrogrades slowly.

MARCH.

The Sun crosses the equator and spring begins March 20, 1 P.M.

Eclipses: There will be two eclipses during the month.

A total eclipse of the Moon on March 10. The whole eclipse will be visible throughout the United States, the beginning in the western portion of the eastern hemisphere and the ending in the Pacific Ocean. The middle of the eclipse comes at $7^h\ 39^m$ P.M. Pacific Standard time, and the total phase lasts $1^h\ 36^m$.

A partial eclipse of the Sun on March 26 invisible in the United States. It may be seen along the west coast of Europe, in Iceland, Greenland and the northeastern portion of North America. The greatest magnitude of the eclipse is about one-third of the Sun's diameter. The time of greatest eclipse is 2 A.M. Pacific Standard time.

Mercury is a morning star throughout the month and comes to its greatest west elongation 27° 48′ on the morning of March 24, but as it is far to the south of the Sun, the conditions for visibility are not good. About that time it rises about an hour before the Sun.

Venus is an evening star and is gradually increasing its distance from the Sun. At the end of the month it sets $2^h\ 22^m$ later than the Sun.

Mars is still an easily seen object in the western sky in the evening. On March 31 it sets about midnight. It is in the constellation *Taurus* and moves eastward about 18° during the month. Its distance from the Earth is rapidly increasing and at the end of the month it is about 161,000,000 miles. It will also diminish materially in brightness.

Jupiter will set before 1 A.M. at the end of the month. It is in the constellation *Gemini* and during the month moves about 2½° eastward.

Saturn by the end of the month will rise at a little after 8 P.M. It is in the eastern part of the constellation *Virgo*, and moves westward a little more than 1° during the month. The rings are open a little wider than they were in January; the ratio of minor axis of the ring to the polar diameter of the planet is about ¾.

Uranus rises a little more than an hour after *Saturn*. It is in the constellation *Libra* and moves slowly westward.

Neptune is in about the same position as before in the constellation *Taurus*. It is moving slowly eastward.

EXPLANATION OF THE TABLES.

The phases of the Moon are given in Greenwich Mean time, which is 8 hours fast of Pacific Standard time. To find the corresponding Pacific Standard time, subtract 8 hours from that given in the table. In the tables for Sun and planets, the second and third columns give the Right Ascension and Declination for Greenwich noon. The fifth column gives the local mean time for transit over the Greenwich meridian. To find the local mean time of transit for any other meridian, the time given in the table must be corrected by adding or subtracting the change per day, multiplied by the fraction whose numerator is the longitude from Greenwich, expressed in hours, and whose denominator is 24. This correction is seldom much more than 1^m. To find the standard time for the phenomenon, correct the local mean time by *adding* the difference between standard and local time if the place is west of the standard meridian, and *subtracting* if east. The same rules apply to the fourth and sixth columns, which give the local mean times of rising and setting for the meridian of Greenwich. They are roughly computed for Lat. 40°, with the noon Declination and time of meridian transit, and are intended as only a rough guide. They may be in error by a minute or two for the given latitude, and for latitudes differing much from 40° they may be several minutes out.

The tables of eclipses of *Jupiter's* satellites give in Pacific Standard time the eclipses which can be seen from some part of the United States. A few of those given occur before sunset in the extreme western part of the country, but after sunset in the east and may be seen there. The Roman numerals indicate the four old satellites in their order of distance from *Jupiter*. No agreement has yet been reached as to naming BARNARD'S new fifth satellite, which is nearer the planet than is Satellite I, and no times of eclipse are given for it. As *Jupiter* is going from opposition to conjunction, the shadow of the planet lies to the east and all eclipse phenomena are to be seen on that side of the planet, those for Satellite IV being at a considerable distance from the disc. For I and II only reappearance (R) can be seen, the satellites entering the shadow while in occultation by the planet. For III and IV both disappearances (D) and reappearances may be seen, the disappearances for III being quite close to the planet's limb soon after its emergence from occultation. The eclipses of IV are the first since April, 1892. During the interval its distance from the planet and its inclination of orbit kept it clear of the shadow.